



Abu Dhabi EHSMS Regulatory Framework (AD EHSMS RF)

EHS Regulatory Instrument

Code of Practice

**EHS RI - CoP 50.0 – Abrasive Blasting and
associated Protective Coating Work**

Version 2.0

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ACKNOWLEDGEMENTS

With gratitude Abu Dhabi EHS Center acknowledges the great support provided by the Executive Council in facilitating the issuance of Abu Dhabi Emirate Environment, Health and Safety Management System (AD EHSMS) and its implementation at Emirate level.

The issuance of the system would not have been possible without the supervision, diligent efforts and productive recommendations of the AD EHS Center Board of Directors.

These documents (Regulatory Instruments) constitute the efforts of the Abu Dhabi EHS Center and the concerned Sector Regulatory Authorities who worked together to integrate all relevant regulatory requirements under *AD EHSMS RF*. The input, contribution and constructive views of all sectors is highly appreciated.

May these documents prove to be beneficial and helpful in system implementation and in expanding the knowledge in the EHS field.



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Preface

This Abu Dhabi EHS Regulatory Instrument was developed by the Industrial Sector Regulatory Authority as the primary Competent Authority for this topic to set the minimum mandatory requirements.

Every effort was made in developing this document so that it does not conflict with existing local or federal laws and regulations. In case of conflict, requirements of the existing local and federal laws and regulations shall prevail, and all concerned are obliged to bring the same to the attention of AD EHS Center for resolution.

This AD EHS Regulatory Instrument has been developed, reviewed and approved, following the process as described in *AD EHSMS Implementation Guideline: The Integration of EHS Requirements in the Emirate of Abu Dhabi*, by the following stakeholders:

- Abu Dhabi EHS Higher Committee;
- Abu Dhabi EHS Center;
- Environment Agency Abu Dhabi;
- Department of Municipal Affairs;
 - Abu Dhabi City Municipality;
 - Al Ain City Municipality;
 - Western Region Municipality;
- Department of Transport – Abu Dhabi;
- Abu Dhabi Water and Electricity Authority;
- Health Authority - Abu Dhabi;
- Higher Corporation for Specialized Economic Zones (ZonesCorp);
- Center for Waste Management – Abu Dhabi;
- Abu Dhabi Tourism Authority;
- Abu Dhabi Food Control Authority;
- Abu Dhabi Education Council;
- Regulation and Supervision Bureau; and
- Other Relevant Federal and Local Competent Authorities.

The AD EHSMS consists of the following hierarchy of documents:

- AD EHSMS RF Elements - Mandatory System Requirements

EHS Regulatory Instruments:

- Standards and Guideline Values - Mandatory EHS threshold and exposure levels
- Codes of Practice - Mandatory EHS technical requirements – subject specific
- Mechanisms - Mandatory system implementation processes and procedures

Guidelines:

- Technical Guidelines - Non-mandatory guidance on how to implement an EHS Regulatory Instrument
- AD EHSMS Guidance Documents - Non-mandatory guidance and interpretation of an *AD EHSMS RF* concept and/or principle

Further, this document is not intended to conflict with any contractual obligations in effect at the time of its issuance. However, all future contracts shall adhere to applicable requirements stated herein, and existing long term contracts shall be brought into compliance with its requirements as soon as reasonably practicable as stipulated by relevant subject authorities.

This document will be reviewed periodically as part of the continual improvement cycle.

1. Introduction

- (a) This Code of Practice (CoP) applies to all employers within the Emirate of Abu Dhabi that have abrasive blasting operations. This CoP is designed to incorporate requirements set by UAE and Abu Dhabi regulatory authorities. If requirements of this document conflict with requirements set by another regulatory authority, employers are required to follow the more stringent requirement.
- (b) This CoP sets requirements for abrasive blasting operations.
- (c) Definitions applicable to this CoP:
- Abrasive: means a solid substance used in an abrasive-blasting operation.
 - Abrasive blasting: means the forcible application of an abrasive to a surface by pneumatic pressure, hydraulic pressure, or centrifugal force.
 - Abrasive-blasting respirator: A respirator constructed so that it covers the wearer's head, neck, and shoulders to protect the wearer from rebounding abrasive.
 - Blast cleaning room: A complete enclosure in which blasting operations are performed and where the operator works inside of the room to operate the blasting nozzle and direct the flow of the abrasive material.
 - Blasting cabinet: An enclosure where the operator stands outside and operates the blasting nozzle through an opening or openings in the enclosure.
 - Clean air: Air of such purity that it will not cause harm or discomfort to an individual if it is inhaled for extended periods of time.
 - Dust collector: A device or combination of devices for separating dust from the air handled by an exhaust ventilation system.
 - Inspirable dust: is any dust which can be inhaled.
 - Particulate-filter respirator: An air purifying respirator commonly referred to as a dust or a fume respirator, which removes most of the dust or fume from the air passing through the device.
 - Respirable dust: Is only that dust which is small enough to be inhaled into the lungs. Airborne dust in sizes capable of passing through the upper respiratory system to reach the lower lung passages. This sort of dust can result in permanent scarring of the lung tissue. Abrasive blasting results in high concentrations of respirable dust.

2. Training and Competency

- (a) Employers shall ensure that EHS training complies with the requirements of:
- (i) *AD EHSMS RF – Element 05 – Training and Competency;*
 - (ii) *AD EHS RI – Mechanism 7.0 – AD EHS Professional Entity Registration;* and
 - (iii) *AD EHS RI – Mechanism 8.0 – AD EHS Practitioner Registration.*
- (b) Employers shall ensure all relevant employees and contractors that perform abrasive blasting operations are trained on:

- (i) physical hazards associated with abrasive blasting operations;
 - (ii) design specification, capabilities and limitations of abrasive blasting systems and their uses at the work site;
 - (iii) methods and procedures that will prevent exposure to hazards associated with abrasive blasting operations;
 - (iv) the importance of control measures;
 - (v) safe work practices;
 - (vi) required use, maintenance and storage of PPE;
 - (vii) emergency response procedures;
 - (viii) storage and handling procedures;
 - (ix) health hazards associated with abrasive blasting and any waste material created by the blasting operation;
 - (x) hazards associated with the blast media used in abrasive blasting;
 - (xi) signs and symptoms of exposure to the abrasive material used in abrasive blasting operations at the work site and the waste material created from the blasting operations;
 - (xii) operator maintenance requirements for abrasive blasting systems;
 - (xiii) methods of communication between the blast operator and the abrasive blast operation's assistant;
 - (xiv) information on the various types of abrasives used for surface preparation at the worksite; and
 - (xv) requirements to protect the environment from impacts/hazards arising from blasting activities.
- (c) Employers shall ensure managers and supervisors of abrasive blasting operations shall be trained on:
- (i) requirements listed in Section 2(a);
 - (ii) maintenance requirements of abrasive blasting systems to ensure they are working appropriately and within specifications;
 - (iii) how to recognize unsafe work practices when performing abrasive blasting operations; and
 - (iv) how to identify when abrasive blasting systems are not working appropriately.
- (d) After an employee receives training on abrasive blasting operations, a competent person shall evaluate the employee performing abrasive blasting to ensure they have understood the training and are following safe work practices.
- (e) Training shall be conducted prior to an employee performing any abrasive blasting operations and annually thereafter. Retraining shall also be conducted if an employee is not following safe work practices.

3. Requirements

3.1 Roles and Responsibilities

3.1.1 Employers

- (a) Employers shall undertake their roles and responsibilities in accordance with the general requirements of *AD EHSMS RF – Element 01 – Roles, Responsibilities and Self-Regulation* Section 3.2.5.
- (b) Employers shall be responsible for performing a risk assessment in accordance with *AD EHSMS RF – Element 02 – Risk Management* to determine the risks associated with abrasive blasting and to identify areas where control measures and safe work practices are required to reduce employee's exposures to hazards.
- (c) Employers shall when purchasing abrasive blasting equipment or that safety features have been designed into the equipment.
- (d) Employers shall consider engineering control measures are evaluated and implemented to remove or reduce employee exposure to hazards associated with abrasive blasting operations.
- (e) Employers shall develop and enforce safe work practices.
- (f) Employers shall ensure that protective equipment or other control measures are used to keep the exposure of employees to hazards associated with abrasive blasting within limits prescribed by *AD EHSMS RF – Standards and Guideline Values*.
- (g) Employers shall develop an inspection, testing and preventative maintenance plan to ensure abrasive blasting systems are safe and working efficiently and according to manufacturer specifications.
- (h) Employers shall ensure that when ventilation systems, blast booths, and/or blasting cabinets are used to control employee exposures they comply with the requirements of *AD EHS RI – CoP 52.0 – Local Exhaust Ventilation*.
- (i) Employers shall ensure maintenance is performed on abrasive blasting systems as per the preventative maintenance plan.
- (j) Employers shall ensure abrasive blasting systems are tested and inspected regularly (at a minimum annually) to ensure the system works in accordance with manufacturers specifications.
- (k) Employers shall monitor abrasive blasting operations to ensure employees are using equipment, safety devices and personal protective equipment appropriately.

3.1.2 Employees

- (a) Employees shall undertake their roles and responsibilities in accordance with the general requirements of *AD EHSMS RF – Element 01 – Roles, Responsibilities and Self-Regulation* Section 3.2.7.
- (b) Employees shall report any activity or defect relating to abrasive blasting operations which they believe is reasonably foreseeable to endanger their safety or that of other person(s).
- (c) Employees shall comply with safe work practices and standard operating procedures.
- (d) Employees shall use appropriate equipment or safety devices provided by the employer in accordance with any training or instruction received in the use of the work equipment or device concerned.
- (e) Employees shall not perform any task requiring training until they have received the required training and it is documented.
- (f) Employees shall not operate any piece of equipment that they are not familiar with and appropriately trained on its use.

3.2 General Requirements

- (a) When performing risk assessments in accordance with *AD EHSMS RF – Element 02 – Risk Management*, the following shall be considered:
 - (i) the blast media used in the abrasive blasting operation and their impact on the health of employee(s) and any impact they may have on the environment;
 - (ii) the material that is being removed along with the material being blasted and its impact on the health of employee(s) and any impact they may have on the environment;
 - (iii) the condition of the abrasive blasting equipment being used (nozzles, compressors, hoses, couplings etc.) and if they are rated by an appropriate International Standard for their intended use;
 - (iv) the type, frequency and duration of abrasive blasting operations;
 - (v) ergonomic risks associated with shot blasting;
 - (vi) the environment in which the abrasive blasting operations is to be undertaken;
 - (vii) the level of experience of the personnel involved in the work; and
 - (viii) any other identified hazards associated with the work.
- (b) When using compressed gas systems, to include pressurized air, as part of the abrasive blasting system, the requirements of *AD EHS RI – CoP 49.0 – Compressed Gases and Air* shall be followed.
- (c) All abrasive blasting operations shall be performed in blasting booths or a blasting cabinet that meets the requirements of *AD EHS RI – CoP 52.0 – Local Exhaust Ventilation* except:

- (i) where, by reason of its shape, size or weight, an article cannot readily be moved or cannot fit into a booth or cabinet and shall be blasted where it is located, eg. boilers, structural steel fabrications, ships, boats, aircraft.
- (d) For abrasive blasting operations that cannot be performed inside a booth or cabinet, a risk assessment shall be performed for the operation and alternative control measures implemented to limit employee exposure to as low as reasonable practicable level. At no time shall dust or hazardous material exposures exceed exposure limits listed in *AD EHS RI – Standards and Guideline Values*.
- (e) Employees shall use respiratory protection at all times while performing abrasive blasting activities.
- (f) Temporary enclosures shall be used when the object or structure is unable to be transported. Any object measuring greater than 2.5m X 2.5m X 3.0m can be considered large in consideration with applicable local / national regulations or the international standard. Temporary enclosures are also used for fixed structures, eg. bridges or water tanks.

3.3 Blast Media

- (a) Use of hazardous blast media shall be eliminated wherever reasonably practicable; where alternatives are not available necessary control measures shall be implemented.
- (b) Safety Data Sheet (SDS) for blast media utilized shall be made available and maintained at the blast location and in the site office.
- (c) The blast media utilized shall be appropriate for the blasting operation.
- (d) Blast media shall be disposed of in an appropriate manner, as per the requirement of *AD EHS RI – CoP 54.0 – Waste Management*.

3.4 Abrasive Blasting Operations Outside a Booth or Cabinet

- (a) Where it is not reasonably practicable to do the abrasive blasting in a booth or cabinet and it is carried out in a building or structure other than a confined space, the building or structure shall be of open construction or a mechanical exhaust system shall be used to prevent the buildup of dusts or hazardous materials.
- (b) Appropriate steps shall be taken to protect the abrasive blaster, other employees or persons in the vicinity, and the environment, from hazards associated with abrasive blasting operations. An abrasive blasting exclusion zone, with restrictions on entry, shall be designated around the area where the abrasive blasting is being carried out. An exclusion zone in itself will not provide appropriate protection and shall be used in conjunction with other control measures.
- (c) All abrasive blasting operations shall be conducted in an isolated location, “exclusion zone.” An abrasive blasting process is not effectively isolated from other operations if dust or contaminants from the abrasive blasting operation can be inhaled by any persons engaged in work near the area. Neither is it effectively isolated from plant, machinery or equipment if there is danger of contamination from the abrasive blasting operation.

- (d) In general, the exclusion zone shall be at least 10 meters horizontal and 4 meters vertical clearance above and below the place where the abrasive blasting is occurring; however, in determining the size of the exclusion zone, the following factors shall be considered:
- (i) the nature of the substance being blasted;
 - (ii) the blast media being used;
 - (iii) the work environment, including wind speed, ambient temperature and humidity;
 - (iv) fire and dust explosion hazards;
 - (v) the location and physical conditions of the site; and
 - (vi) whether other people are reasonably foreseeable to be in the vicinity. Relocation of employees not involved in abrasive blasting activities to other parts of the workplace may be necessary.
- (e) Greater vertical clearance may be required when abrasive blasting at heights as dusts can travel with air currents and settle on surfaces below.
- (f) Once an abrasive blasting exclusion zone has been established, a number of procedures shall be implemented to control risks. These include:
- (i) physical barriers and warning signs to prevent unprotected persons from entering the exclusion zone;
 - (ii) restricted entry of unprotected persons into the exclusion zone for a time period that ensures airborne concentrations of hazardous substances have reduced to below the relevant exposure standards;
 - (iii) removal of hazardous substances that are not immediately needed for abrasive blasting, to reduce unnecessary exposure and fire or explosion risks;
 - (iv) removal of stored wastes and solvents from within the exclusion zone to control fire or explosion risks;
 - (v) removal of electrical and ignition sources, including smoking, from within the exclusion zone to control fire and dust explosion risks; and
 - (vi) restriction of abrasive blasting within 20 meters of the boundary to adjacent premises or a greater separation where sensitive appropriately is located.
- (g) Consideration shall be given to ensure dust created from abrasive blasting is controlled in walkways, public areas and air conditioning intake vents. Persons other than the abrasive blaster and their assistant shall not enter the exclusion zone during a blasting operation unless equivalent personal protective equipment is worn. A sign stating “ABRASIVE BLASTING AREA - AUTHORISED PERSONNEL ONLY” shall be prominently displayed at the exclusion zone.

3.5 Abrasive Blasting Operations in a Workroom

- (a) If the room to be used for abrasive blasting is within a building, there shall be a local exhaust ventilation system installed to remove dusts and waste materials. Exhausted air shall be filtered before it is ventilated to the outside atmosphere.

- (b) If the spray area is part of a larger room (for example, a hangar), employers shall enclose the blasting area and install a local exhaust ventilation system that filters the exhaust prior to ventilating to the outside atmosphere.
- (c) Before blasting, all potential sources of ignition shall be removed. Unprotected electrical equipment shall be removed or isolated. If there has to be any electrical equipment in the spray room, a risk assessment and hazardous area classification shall be carried out to decide the level of protection required.
- (d) Ventilation shall be provided to ensure that a dust inhalation hazards to employees and dust explosion hazards do not exist.
- (e) Applicable control measures listed in other relevant sections of this document shall be followed.

3.6 Abrasive Blasting in Confined Space

- (a) Abrasive blasting operations that are conducted in confined spaces shall be performed in accordance with the requirements of *AD EHS RI – CoP 27.0 – Confined Spaces*.
- (b) Abrasive blasting operations that are conducted in confined spaces shall implement a Permit to Work System that meets the requirements of *AD EHS RI – CoP 21.0 – Permit to Work Systems*.
- (c) Working in a confined space shall not be permitted if an explosive atmosphere can exist due to dust created by the blasting operation.
- (d) Ignition sources that could cause a dust explosion identified as a part of risk assessment shall be eliminated prior to the commencement of abrasive blasting.
- (e) Ventilation within the confined space shall be maintained until abrasive blasting operation is completed and there is no further risk to the health of employees.

3.7 Atmospheric Monitoring / Air Sampling

- (a) When performing abrasive blasting operations, the work atmosphere shall be monitored though air sampling to assess the employee exposures to dusts and hazardous materials:
 - (i) air sampling results shall be compared with *AD EHS RI – Standards and Guideline Values*; and
 - (ii) if air sampling results exceed the permissible exposure limits set by *AD EHS RI – Standards and Guideline Values*, then control measures shall be implemented to reduce / prevent employee exposures.
- (b) If monitoring results indicate that control measures are required to reduce / prevent employee exposures, air sampling shall be used to assess the effectiveness of the control measures.
- (c) Air sampling shall be at a frequency decided by the risk assessment and the blast media, or material being blasted that could affect an employee's exposure.

- (d) Air sampling records shall be maintained that include:
- (i) who performed the sampling;
 - (ii) procedures used for air sampling;
 - (iii) location of air sampling;
 - (iv) date and time of sampling;
 - (v) serial number of equipment used for sampling;
 - (vi) calibration data for sampling equipment;
 - (vii) analytical methods used for sampling;
 - (viii) laboratory used to analyze of samples;
 - (ix) laboratory certifications;
 - (x) chain of custody for the samples;
 - (xi) sampling results; and
 - (xii) report of findings and corrective actions.
- (e) Laboratory analysis shall be conducted by laboratories approved by the Emirates Standardization and Metrology Authority (ESMA).

3.8 Maintenance and Cleaning

- (a) Abrasive blasting equipment shall be cleaned daily or at the end of each shift.
- (b) Waste material shall be stored and disposed of in accordance with the requirements of *AD EHS RI – CoP 54.0 – Waste Management*.
- (c) Employers shall develop a maintenance program that ensures equipment is working appropriately and provides early detection of any defect in control measures that could result in a reduced level of protection.
- (d) Abrasive blasting equipment shall be inspected prior to use on each shift. Examination of the equipment shall include:
- (i) visual inspection of equipment looking for worn equipment, damaged equipment, integrity of joints / connections / hoses and any leaks;
 - (ii) personal protective equipment shall be inspected to ensure it is clean and is not damaged; and
 - (iii) if a local exhaust ventilation system is used, it shall be inspected to ensure it is working appropriately and filters are in good condition.
- (e) Service records shall be maintained that include:
- (i) equipment and control measures which require servicing;
 - (ii) nature of the servicing needed;
 - (iii) frequency of the servicing;

- (iv) who is responsible for the servicing;
- (v) documentation of defects and how they were corrected; and
- (vi) performance testing and evaluation.

3.9 Occupational Health

- (a) Employees shall not be allowed to eat, drink, or smoke in the vicinity of abrasive blasting operations. No open containers of food or drink shall be stored within or close to abrasive blasting operations where contaminants could enter the open container.
- (b) Appropriate changing rooms and showers shall be provided at the worksite for employees working in abrasive blasting operations as a major part of their daily work.
- (c) Employers shall have a first aid and medical treatment program in compliance with *AD EHS RI – CoP 4.0 – First Aid and Medical Treatment*.
- (d) Employers shall have a medical surveillance program in compliance with *AD EHS RI – CoP 5.0 – Medical Surveillance*.

3.10 Emergency Response

- (a) Emergency Response procedures compliant to *AD EHSMS RF – Element 06 – Emergency Response & Management* shall be developed for all abrasive blasting operations. Requirements for emergencies involving abrasive blasting operations include medical emergencies, hazardous material exposures, fire, explosions etc. as identified through the Risk Assessment required by Section 3.1(a)(ii) of this CoP.
- (b) First aid procedures in accordance with *AD EHS RI – CoP 4.0 – First Aid and Medical Treatment* shall be developed.

4. Record Keeping

- (a) Employee medical surveillance and medical records shall be maintained in accordance with *AD EHS RI – CoP 5.0 – Medical Surveillance*.
- (b) All maintenance, inspection and testing records shall be maintained in accordance with *AD EHSMS RF – Element 09 – Compliance and Management Review*.
- (c) Employee training records shall be maintained in accordance with *AD EHSMS RF – Element 09 – Compliance and Management Review*.

5. References

- *AD EHSMS RF – Element 01 – Roles, Responsibilities and Self-Regulation*
- *AD EHSMS RF – Element 02 – Risk Management*

- *AD EHSMS RF – Element 06 – Emergency Response & Management*
- *AD EHSMS RF – Element 09 – Compliance and Management Review*
- *AD EHS RI – CoP 1.0 – Hazardous Materials*
- *AD EHS RI – CoP 4.0 – First Aid and Medical Treatment*
- *AD EHS RI – CoP 5.0 – Medical Surveillance*
- *AD EHS RI – CoP 21.0 – Permit to Work Systems*
- *AD EHS RI – CoP 27.0 – Confined Spaces*
- *AD EHS RI – CoP 49.0 – Compressed Gases and Air*
- *AD EHS RI – CoP 52.0 – Local Exhaust Ventilation*
- *AD EHS RI – CoP 54.0 – Waste Management*
- *OSHA ventilation standard for general industry (29 CFR 1910.94)*
- *Abrasive Blasting Code of Practice 2004 Workplace Health and Safety Queensland*
- *OSHA PART 1910 – Occupational Safety and Health Standards — Subpart G— Occupational Health and Environmental Control § 1910.94 Ventilation*
- *Industrial Sector EHS Regulatory Authority (ZonesCorp) Awareness Flyer on Abrasive Blasting & Spray Painting*

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